

A method for maintaining amplifier saturation in a wavelength division multiplexed (WDM) optical network having a plurality of sub-bands, each sub-band including at least two signal channels which carry respective data signals, and a plurality of substitute signal transmitters, each substitute signal transmitter generating a substitute signal and corresponding to a respective one of the plurality of sub-bands, includes identifying signal channels having a predetermined characteristic within each of the plurality of sub-bands. A substitute signal transmitter is turned on if the sub-band corresponding to the substitute signal transmitter includes a predetermined number of signal channels having said predetermined characteristic. The data signals and the substitute signals are combined into a WDM signal, and the WDM signal is transmitted over an optical transmission fiber.